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NOTES ON GEOGRAPHIC DISTRIBUTION

Revision of the geographic distribution of three species of the *montanus* group of *Liolaemus* Wiegmann, 1834 (Reptilia: Squamata: Liolaemidae)

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ABSTRACT: Here I review the distribution of three *Liolaemus* species of the *montanus* group. I conclude that *L. signifer* has been recorded in Peru (Puno, Tacna and Moquegua, departments), Bolivia (La Paz, Cochabamba and Oruro departments) and northern Chile (Arica and Parinacota Region). *Liolaemus multicolor* and *L. andinus* should be restricted to Argentina.

Liolaemus is one of the most diverse genera of iguanian lizards, with 239 species presently recognized (Uetz 2013). The genus is divided into two subgenera: *Liolaemus* (*sensu stricto*) and *Eulaemus* (Laurent 1985). The *montanus* group belongs to the *nigriceps* series of the *montanus* section of the subgenus *Eulaemus* (Fontanella *et al*. 2012). Lobo *et al*. (2010) listed 59 species for this group. However, they omitted to include *L. lopezi* Ibarra-Vidal, 2005. Later, four new species were described for the group: *L. cazianiae* Lobo, Slodki & Valdecantos, 2010; *L. halonastes* Lobo, Slodki & Valdecantos, 2010; *L. vulcanus* Quinteros & Abdala, 2011; and *L. porosus* Abdala, Paz & Semhan, 2013. Therefore, the *montanus* group currently comprises 64 species.

Here, I review the records of three species of the *montanus* group. For this purpose, I examined museum specimens (Appendix I) and reviewed the literature on each species. Examination of scales was made using lenses of different magnifications, and measurements were taken with a digital vernier caliper (±0.02 mm precision). Dorsal scales were counted between the occiput and the level of the anterior border of the hind limbs. Acronyms mentioned in this publication are: BMNH (Natural History Museum, Londres), CBF (Colección Boliviana de Fauna), FMNH (Field Museum of Natural History), KU (University of Kansas, Biodiversity Institute), MCN (Museo de Ciencias Naturales de la Universidad Nacional de Salta), MNHN-CL (Museo Nacional de Historia Natural, Chile), MNHN-Paris (Muséum National d'Histoire Naturelle, Paris), SDSU (San Diego State University Collection) and SSUC (Colección de Flora y Fauna Patricio Sánchez Reyes, Pontificia Universidad Católica de Chile). Finally, I discuss the records for these three species, ordered according to their geographical distribution (north to south).

***Liolaemus signifer* Duméril & Bibron, 1837.** This poorly known species was described for "Chili" based on a single specimen. Shortly after, this specimen was redescribed by Bell (1843) and illustrated by Duméril *et al*. (1854) (Figure 1). Since the type locality was poorly defined, several authors have considered this species as widely distributed in the highlands of Peru, Bolivia, Chile and Argentina (Koslowsky 1898; Donoso-Barros 1966). Later, Cei *et al*. (1980) rediscovered the holotype (MNHN-Paris 6860) and restricted the type locality to the "highlands of Peru and Bolivia". This decision is in accordance with D'Orbigny (1847), who collected the holotype and mentioned his route as follows: Valparaíso (Chile), Puerto de Cobija (Chile), Puerto de Arica (Chile), Tacna (Peru) and La Paz (Bolivia). In this trajectory, specimens of the *montanus* group have only been recorded between Tacna and La Paz (all current records are referred as *L. signifer*). Also, Cei *et al.* (1980) indicated the existence of one specimen from Huaracone, Puno department, Peru (MNHN-Paris 2503). However, Laurent (1984) highlighted notable differences between measurements of the body and tail indicated by Duméril and Bibron (1837) and Bell (1843), compared to the measurements reported by Cei *et al*. (1980) for the holotype of *L. signifer*. Although there are doubts regarding the specimen MNHN-Paris 6860 as really being the holotype of *L. signifer*, there is no a conclusive study and because Duméril and Bibron (1837) and Bell (1843) mentioned that there is only one type specimen, I consider the specimen MNHN-Paris 6860 as the holotype. On the other hand, despite the restriction of the type locality made by Cei *et al*. (1980), these authors keep *L. signifer* as a species distributed in the highlands of Peru, Bolivia, Chile and Argentina "considering the literature data" (my own translation, p. 923). Therefore, an analysis of the publications that mention *L. signifer* after 1980 is required.

Regarding Argentina, Cei (1993) and Avila *et al*. (2010, 2013) exclude *Liolaemus signifer* from this country.

Regarding Bolivia, Fugler (1989) reported a population from Pacajes Province, but did not list specimens. De la Riva *et al*. (1992) reported a population from Ulla-Ulla but also did not list specimens. Ibisch and Böhme (1993) recorded specimens from Palamani Pampa and Jachcha Kochi (Cochabamba). Aparicio (1993) recorded this species from Huaraco. Later, Dirksen and De la Riva (1999) reviewed all these locations and added more records based on museum collection catalogues, and also they provided coordinates

for those they could identify: Road between Caracoles and Quime, Cordillera Tres Cruces, road between La Paz and Tiahuanaco, La Cumbre, 130 km NE of La Paz, 35 mi NW of La Paz, Potone, Tiahuanaco, Esperanza (Province Pacajes), 7 km E of Ulla Ulla, Caupolicán (Hacienda Corpaputu, 10 km E of Achacachi), Patacamaya, Altiplano (Oruro), 5 km NE of Oruro, 15 km NE of Oruro, 60 km NE of Oruro, Hacienda Huancaroma, 8 km S of Eucaliptos, Chocaya, 30 mi N of Potosí and 7 km S of Potosí. Later, Abdala *et al*. (2008) listed specimens from Confital (Cochabamba). Finally, De la Gálvez and Pacheco (2009) indicated the presence of *L. signifer* at 20 locations between Titicaca and La Paz and in southern La Paz. The authors also provide a map, but unfortunately did not refer to the names and coordinates for these locations. Even though many of these records are not specific (only indicating the province), they are all in the department of La Paz and the neighboring departments of Cochabamba and Oruro in areas bordering La Paz department, except the records from the vicinity of Potosí and Chocaya, located in Potosí department, which are more than 220 Km S (straight line) from any other location (Figure 2). I believe that these records are doubtful and need confirmation, especially considering that the similar species *Liolaemus schmidti* Marx 1960 has been recorded in Potosí department (Dirksen and De la Riva 1999).

As for Peru, Abdala *et al.* (2008) listed specimens from Puno department: Lago Titicaca, Lago Titicaca road to Puno, 82 Km W Puno, Pichupichuin (8 km NW Huacallani), Caccahara (probably Cacachara), 12.9 km SW Limbani, 4 km NW of Juliaca, Huaylarco (88.5 km NE Arequipa; probably Huaylarco from Moquegua department) and 5 km W Tincopalca; Tacna department: 16 Km S Taratara and 5 km E Lago Suches; Moquegua department: Pampa Huatire; Arequipa department: Vicoyaca; Ayacucho department: 35 km NE Puquio; and Apurimac department: 40 Km SW Chalhuanca. Records from Arequipa department are very close to the distribution of *Liolaemus annectens* Boulenger 1901, a species previously considered a subspecies of *L. signifer* (Laurent 1992), but recently elevated to full species (with no data provided) by Pincheira-Donoso *et al*. (2008). It is necessary to carry out a study to clarify the relationships between these species and check the records of *L. signifer* from Arequipa. The same goes for the records from Apurimac and Ayacucho (Figure 2), which are close to the type locality of *L. melanogaster* Laurent 1998.

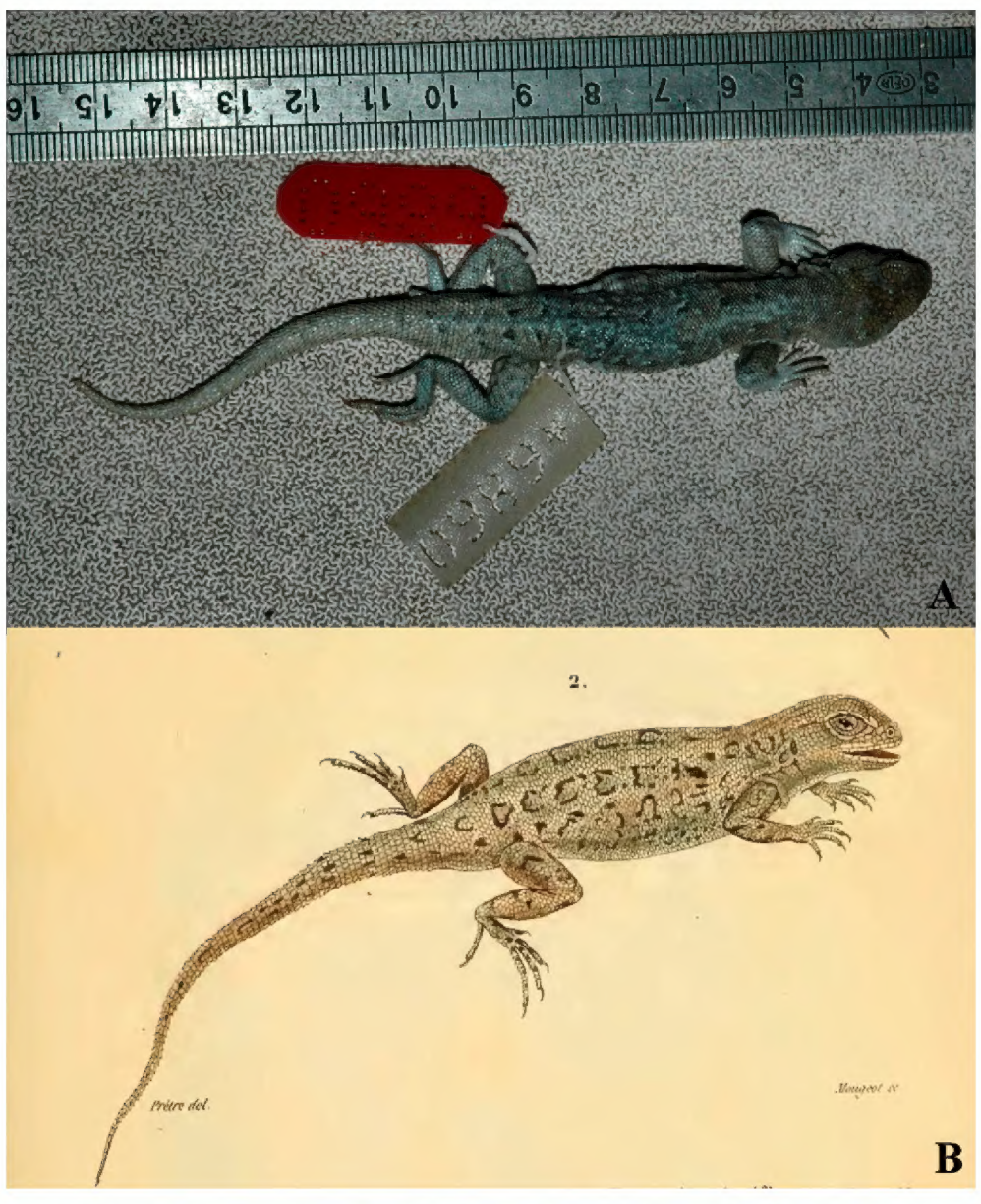

Figure 1. *Liolaemus signifer*. A) Currently recognized holotype (MNHN-Paris 6860) from highlands of Peru and Bolivia, collected between Tacna and La Paz (photograph by I. Ineich). B) Illustration of *L. signifer* taken from Duméril *et al*. (1854).

Regarding Chile, Veloso and Navarro (1988), indicated that this species occurs in the highlands of the Antofagasta Region between 3600 and 4600 m, although they do not mention specific localities or specimens examined. Núñez and Jaksic (1992), included it for Chile without data. Interestingly, Núñez (1992) did not indicate locations for *Liolaemus signifer* in the catalog of geographic data of Chilean reptiles and snakes in the Museo Nacional de Historia Natural de Chile. However, Núñez and Veloso (2001) also mentioned that this species occurs in the highlands of Antofagasta Region without any data. Valladares *et al*. (2002) listed one specimen from Cariquima, Tarapacá (SDSU 1600), but this record is not from Cariquima since the specimen SDSU 1600 was collected in Puno (Peru) by W.E. Duellman (R. Langstroth, pers. comm.). Finally, Pincheira-Donoso and Núñez (2005) included *L. signifer* for Chile and provided a description. In the section Material Estudiado (p. 450), these authors indicated that they examined the specimens BMNH-51.7.17.76 from "Chili" and BMNH-1902.5.29.63-73 from Uyuni, (Potosí, Bolivia). The locality "Chili" for the first specimen is too vague to sustain the presence of *L. signifer* in Chile. On the other hand, Uyuni (Potosí department) could represent an important distributional expansion. However, *L. schmidti* has been recorded in Potosí (FMNH 204525-26), and since Pincheira-Donoso and Núñez (2005) indicated that *L. schmidti* is a synonym of *L. andinus* without providing any data (Lobo *et al*. 2010) the status of the specimens from Uyuni should be revised.

Also, Pincheira-Donoso and Núñez (2005) indicate that they examined two specimens from Tacora (Visviri, Arica y Parinacota Region, Chile) (p. 175), although these specimens were not included in the section about the material examined. I agree with Pincheira-Donoso and Núñez (2005) that the specimens MNHN-CL 2065-66 (two males) correspond to *Liolaemus signifer*, based on a comparison of these with several digital photographs of specimens of *L. signifer* from Bolivia, photographs of the holotype, and the examination of specimens of *L. pleopholis* Laurent 1998 (the most similar and geographically closest species). Laurent (1998) provides two diagnostic characteristics that distinguishe *L. pleopholis* from *L. signifer*: dorsal scales count and female Hellmich index (dorsal head scales). Table 1 provides the dorsal scale counts and one more scalation character that differs bewteen the species. I was unable to compare the female Hellmich index because the two specimens from Tacora are males. Additionally, Pincheira-Donoso and Núñez

(2005) indicated that in *Liolaemus signifer* the scales of the dorsal dark spots have less developed keels than in *L. pleopholis* (p. 168). However, I found that both species have developed keels on dorsal dark spots (Figure 3).

The dorsal pattern of coloration is similar in both species. The adult males of *Liolaemus signifer* have olive-brown, bright green or light brown dorsal color and may have a marked or diffuse pattern (Figure 4). Females have brown dorsal color and a defined pattern. This variability was previously described by Cope (1875), Pearson (1954) and Hellmich (1962). Color pattern in life can be seen in De la Gálvez and Pacheco (2009). On the other hand, Laurent (1998) indicated that the adult males of *L. pleopholis* have gray dorsal color with a diffuse pattern or uniform gray, and Veloso *et al*. (1982) indicated that males have uniform bright green or yellow coloration.

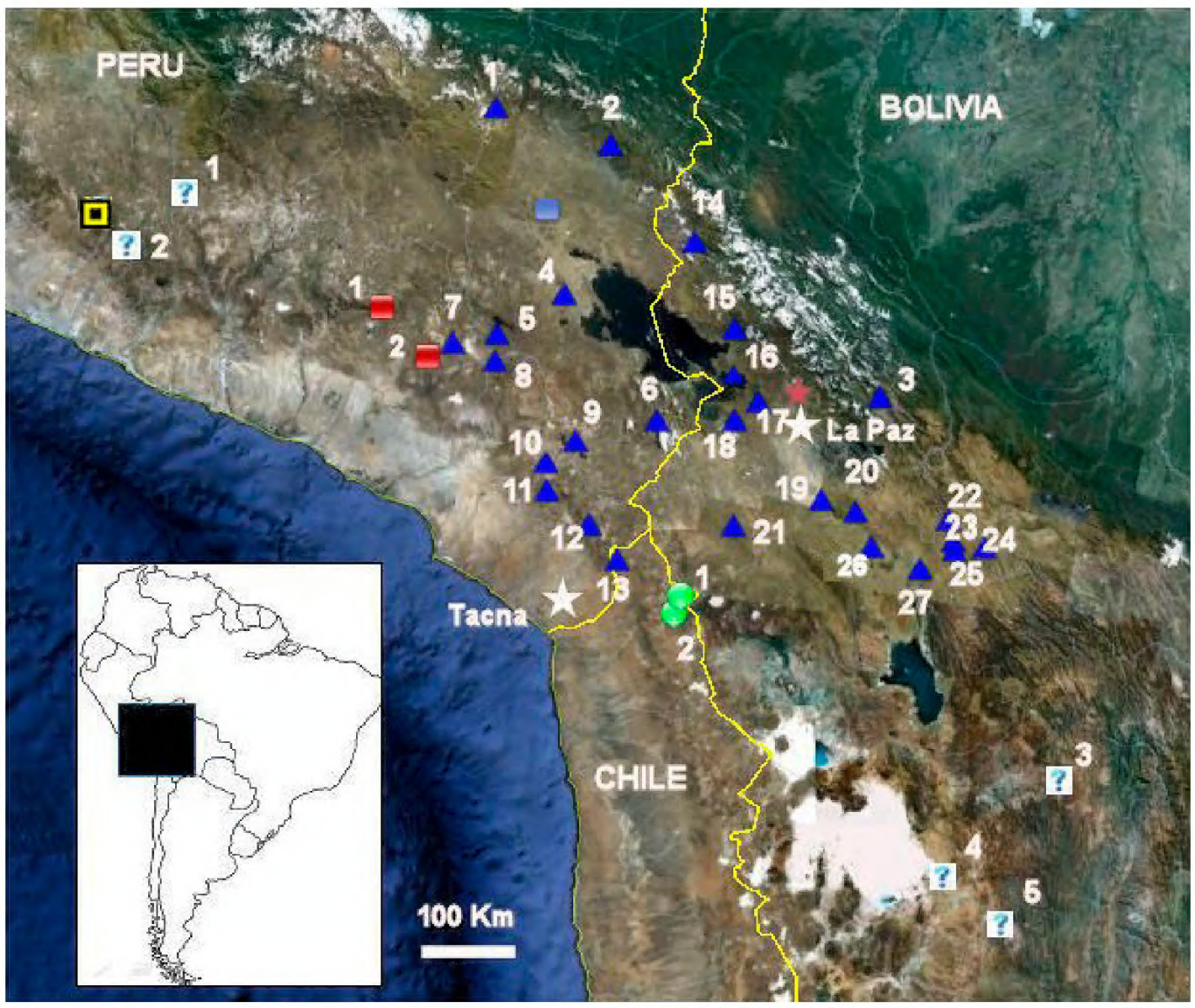

Figure 2. Distributional map for *Liolaemus signifer* and the species of the montanus group that inhabit near to transect Tacna-La Paz. Records were taken from Abdala *et al*. (2008), Dirksen and De la Riva (1999), Laurent (1998) and Pincheira-Donoso and Núñez (2005). Blue triangles: records for *L. signifer* (1 = Huaracone, 2 = Limbani, 3 = La Cumbre, 4 = Juliaca, 5 = Tincopalca, 6 = Pichupichuin, 7 = Vicocaya, 8 = Huaylarco, 9 = Cacahara, 10 = Lago Suches, 11 = Pampa Huatire, 12 = Taratara, 13 = Tacora, 14 = Ulla-Ulla, 15 = Sorata, 16 = Huatajata, 17 = Pucarani, 18 = Tiahuanaco, 19 = Patacamaya, 20 = Huaraco, 21 = Esperanza, 22 = Jachcha Kochi, 23 = Challa, 24 = Palamani Pampa, 25 = Confital, 26 = Huancaroma and 27 = surroundings of Oruro). Blue question mark: Doubtful records for *L. signifer* (1 = 40 Km SW from Chalhuanca, 2 = Puquio, 3 = surroundings of Potosí, 4 = Uyuni and 5 = Chocaya). Red squares: records for *L. annectens* (1 = Caylloma and 2 = Sumbay; both type localities). Green circle: records for *L. pleopholis* (1 = Caquena and 2 = Pampa Chucuyo, type locality). Red star: *L. forsteri* (Chacaltaya, type locality). Light blue square: *L. tropidonotus* (Tirapata, type locality). Yellow square with black center: *L. melanogaster* (45 km east Puquio, type locality). Main cities are indicated.

Figure 3. Comparison between dorsal scales of *Liolaemus signifer* (left, MNHN-CL 2065) and *L. pleopholis* (right, MNHN-CL 3950). Note that both species have more developed keels on the dark spots on the dorsum.

Table 1. Some scalation differences between *Liolaemus signifer* and *L. pleopholis* (adult specimens only). According to Laurent (1998) the dorsal scale count range is 61-87 for *L. signifer* and 87-98 for *L. pleopholis*.

	***L. signifer* (2♂, Tacora, Chile)**	***L. signifer* (1♂, 1♀, Patacamaya, Bolivia)**	***L. signifer* (♂, Holotype)**	***L. pleopholis* (2♀)**
Temporal scales	8	-	8	12–13
Dorsal scales	77–86	75–76	80	96–99

Although in this study I have confirmed the different range of dorsal scales count proposed by Laurent (1998), it is necessary to conduct a study to clarify the relationship between both species and provide a clearer diagnosis, since apparently *Liolaemus pleopholis* is either a cryptic species or maybe a synonym of *L. signifer*.

Liolaemus signifer can be diagnosed from the geographically nearby species by the following combination of characters: 1) 61–87 dorsal scales (Laurent 1998); 2) rounded to subtriangular dorsal scales (smooth or slightly keeled); 3) juveniles, females and subadult males with dark spots over light brown dorsal color; 4) adult males with green shades and diffuse dorsal pattern. On the other hand, *L. pleopholis* has 87–98 dorsal scales (Laurent 1998), *L. tropidonotus* Boulenger 1902 has strongly keeled dorsal scales (Boulenger 1902; Núñez 2004) and the males of *L. schmidti* and *L. forsteri* Laurent 1982 never have green dorsal color. Diagnosis with respect to *L. annectens* is uncertain and must be provided in a future study.

Other records for *Liolaemus signifer* may be based on those localities for specimens that have been identified as synonyms of *L. signifer*. Cope (1875) described *L. multiformis* from Titicaca (Peru), which later was considered a synonym of *L. signifer* by Halloy and Laurent (1988). Hellmich (1962) recorded *L. multiformis* (= *L. signifer*) from Sorata, Pucarani and Huatajata, all from the vicinity of Titicaca (Bolivia). Donoso-Barros (1966) considered that *L. variabilis* Var. *crequii*, *L. variabilis* Var. *neveui* and *L. variabilis* Var. *courtyi* (all from Tiahuanaco, Bolivia) are synonyms of *L. signifer.*

Additionally, Pearson (1954) studied the ecology of *L. signifer* in a population from southern Peru (Lago Suche) and mentioned one specimen at 4800 m (Volcan Tutupaca, Tacna). De la Gálvez and Pacheco (2009) studied the effect of exploitation of *L. signifer* for traditional medicinal purposes. This species is listed as Least Concern (IUCN 2013).

In conclusion, this species has been recorded from Puno, Tacna and Moquegua departments (Peru), several locations from La Paz, Cochabamba and Oruro departments (Bolivia), and the Arica y Parinacota Region in Chile. All of these records are between 3700–4800 m (estimated with Google Earth). The records from Arequipa, Apurimac and Ayacucho departments (Peru) need to be reevaluated with an improved diagnosis of *Liolaemus annectens* and other species described from Peru. The records from the highlands of Antofagasta (Chile) and Potosí (Bolivia) are probably a misidentification of *L. schmidti.*

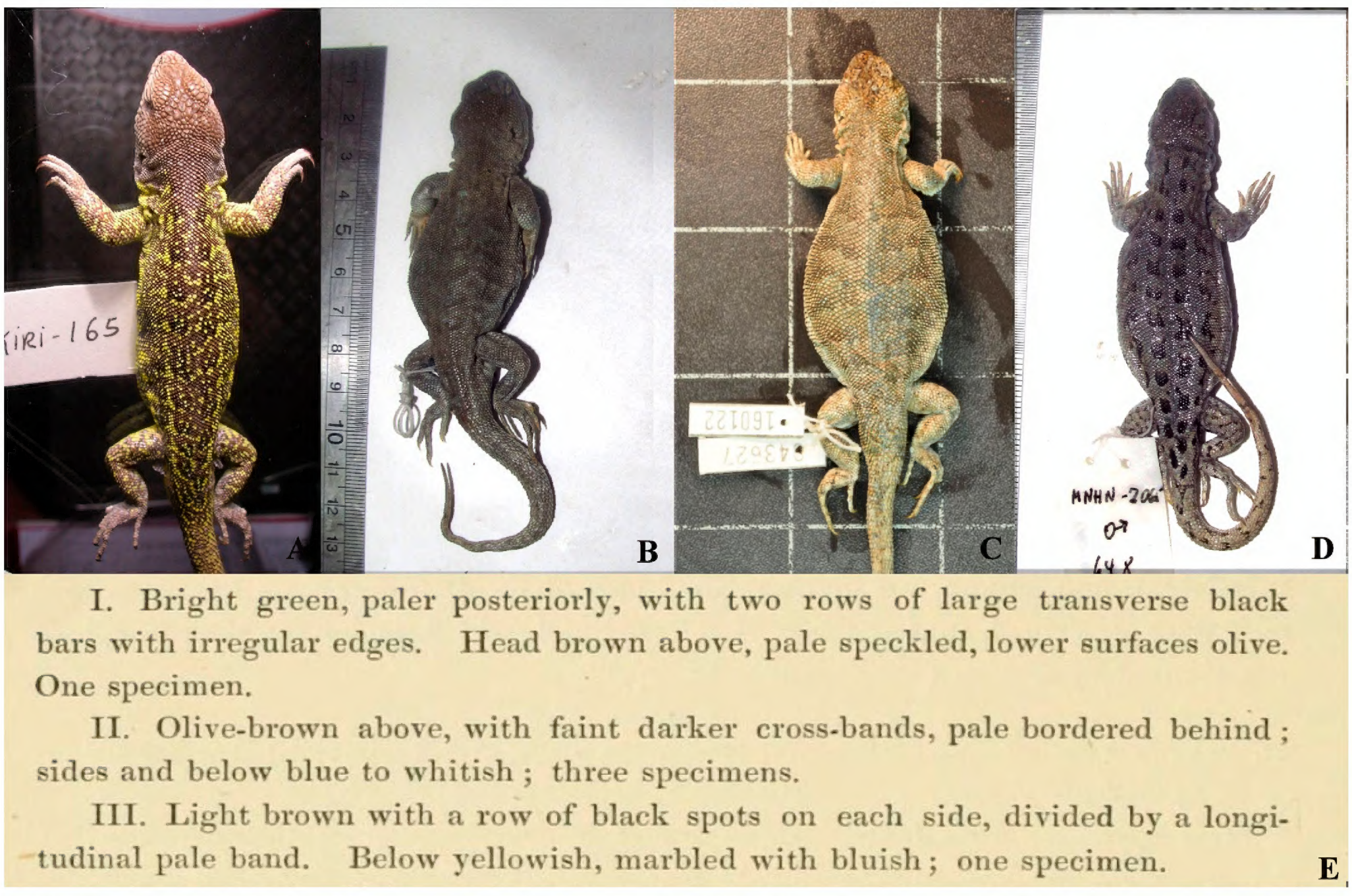
A
B
C
D
I. Bright green, paler posteriorly, with two rows of large transverse black bars with irregular edges. Head brown above, pale speckled, lower surfaces olive. One specimen.
II. Olive-brown above, with faint darker cross-bands, pale bordered behind; sides and below blue to whitish; three specimens.
III. Light brown with a row of black spots on each side, divided by a longitudinal pale band. Below yellowish, marbled with bluish; one specimen.
E

Figure 4. Dorsal patterns of adult male specimens of *Liolaemus signifer*. A) CBF 3072 from Patacamaya, La Paz, Bolivia (photograph by M. Ocampo). B) MNHN-CL 2066 from Tacora, Arica y Parinacota, Chile. C) KU 160122 from Challa, Cochabamba, Bolivia (photograph by A. Campbell). D) MNHN-CL 2065 from Tacora, Arica y Parinacota, Chile. E) Description of dorsal patterns of *L. multiformis* (junior synonym of *L. signifer*) taken from Cope (1875). Similar patterns can be seen in Pearson (1954) and Hellmich (1962) for specimens of *L. multiformis* (= *L. signifer*) from Peru and Bolivia, respectively.

***Liolaemus multicolor* Koslowsky, 1898**. It is a medium-sized *Liolaemus*, with remarkable sexual dimorphism, moderate gular fold, dorsal scales smaller than the ventral scales and slightly keeled paravertebral scales (Cei 1993). This species was described from Jujuy Province, Argentina. Later, Laurent (1982) restricted the type locality to Valle de Guyatayoc, Jujuy Province. Also, Laurent (1991) provided other localities where other specimens had been collected: Abrapampa, Rio Santa Catalina (near Piscuno), Laguna Pozuelos, Cangrejillos (southern Salinas Grandes, Salta), Esquina Grande, Salar de Rincón (near Catua), Río Rosario de Susques (southern Salar de Olaroz), Cholcan Arriba and Tablayo (west of Champi Rodero). All these localities lie between 3390 and 4400 m. Additionally, Valdecantos and Lobo (2007) collected specimens from Nevado de Acay (4080 m) and Abdala *et al*. (2008) recorded several specimens from the vicinity of Abrapampa and Olacapato (several with coordinates). All these records are from Argentina, in Jujuy Province, except the record from Nevado de Acay, vicinity of Olacapato and Salar de Rincón (northern Salta Province, near the border of Jujuy Province) (Figure 5). The species is not listed in the IUCN Red List (IUCN 2013).

Additionally, the species has been reported for Chile by Núñez and Veloso (2001) from Antofagasta Region, without indicating a specific location or specimens collected. Later, Pincheira-Donoso and Núñez (2005) indicated the existence of one specimen (MNHN-CL-2988) from Salar de Aguas Calientes at 4200 m, Antofagasta Region (Figure 5). Unfortunately, there are two places called Salar de Aguas Calientes in Antofagasta (northern and southern), both at 4200 m. These are separated by 30 Km, and both are approximately 70 Km NW of the nearest record of *Liolaemus multicolor* in Argentina (Río Rosario de Susques). Pincheira-Donoso and Núñez (2005) indicate that they are not sure which species this specimen belongs: "a comparative review of many adults of *L.* (*Eulaemus*) *multicolor* from Argentina (DBCGUCH) and the specimen from Chile, allows us establish some doubts on its real status, which however may be explained in that it is a specimen of small size (SVL = 55.7 mm), which would correspond to a juvenile; nevertheless, it is interesting to open the possibility that this specimen indeed corresponds to a female of *L.* (*Eulaemus*) *andinus*, problem that could be solved by a more detailed examination of available juveniles of *L. (Eulaemus) multicolor* from Argentina..." (my own translation, p. 164).

In fact, the record from Salar de Aguas Calientes (Chile) corresponds to a juvenile male of *Liolaemus molinai* Valladares, Etheridge, Schulte, Manríquez & Spotorno 2002; and not to *L. multicolor* or *L. andinus*, because: (1) The dorsal coloration pattern of the specimen from Aguas Calientes is the same as that of males of *L. molinai* (Figure 6); (2) The specimen MNHN-CL 2988 has smooth paravertebral scales, whereas *L. multicolor* has keeled paravertebral scales (Cei 1993); (3) The specimen MNHN-CL-2988 (SVL = 55.7 mm) has well developed precloacal pores, whereas in juvenile males of *L. multicolor* the precloacal pores begin to develop

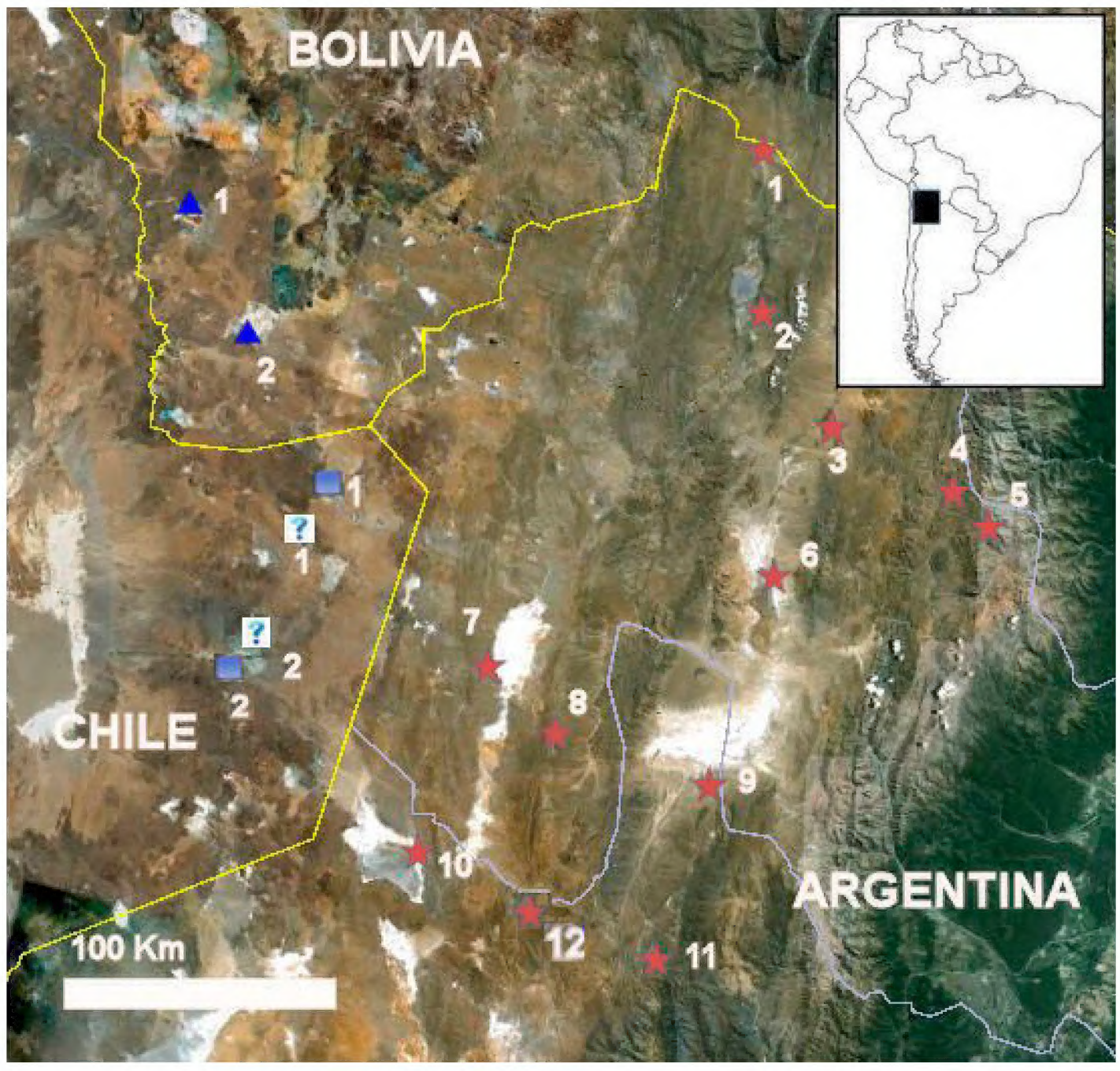

Figure 5. Distributional map for *Liolaemus molinai*, *L. multicolor* and *L. erguetae*. Blue triangles: records for *L. erguetae* (1 = Laguna Colorada and 2 = Chalviri; Laurent 1995). Light blue square: record for *L. molinai* (1 = Farellones de Tara and 2 = Laguna Lejía). Blue question mark: Northern Salar de Aguas Calientes (1) and southern Salar de Aguas Calientes (2). Red stars: records for *L. multicolor* (1 = Piscuno, 2 = Laguna Pozuelos, 3 = Abrapampa, 4 = Tablayo, 5 = Cholcan Arriba, 6 = Guyatayoc, 7 = Río Rosario de Susques, 8 = Esquina Grande, 9 = Cangrejillos, 10 = Salar de Rincón, 11 = Nevado de Acay and 12 = surroundings of Olacapato).

when males reach approximately 55 mm (Valdecantos and Lobo 2007) (Figure 7); (4) The specimen MNHN-CL 2988 has dark spots scattered on the belly like males of *L. molinai*, whereas *L. multicolor* specimens have an immaculate belly or dark lines (Cei 1993); (5) The northern Salar de Aguas Calientes is only 15 km NW of Los Farellones de Tara, type locality of *L. molinai* and the southern Salar de Aguas Calientes is only 40 km; therefore, in any case, the distance between these two populations is small; (6) The specimen MNHN-CL 2988 has precloacal pores, whereas *L. andinus* has no preclocal pores (Koslowsky 1895); (7) The specimen MNHN-CL 2988 has 86 scales around midbody, whereas *L. andinus* has 98-110 scales around midbody (Koslowsky 1895; Laurent 1982).

Another major problem here is the lack of diagnosis between *Liolaemus molinai* and *L. erguetae* Laurent 1995 (the most similar species), since Valladares *et al.* (2002) did not provide a diagnosis to distinguish them. Both species have similar color pattern and females have precloacal pores. It is necessary to conduct a comparative study of both species. It is possible that *L. molinai* may be a junior synonym of *L. erguetae* (R. Langstroth, pers. comm.).

In conclusion, *Liolaemus multicolor* should be considered endemic to Argentina and the record from Salar de Aguas Calientes (Chile) corresponds to *L. molinai*.

***Liolaemus andinus* Koslowsky, 1895**. The species was described from the highlands of Catamarca province (Argentina), between 3000 and 4000 m. Koslowsky (1895) pointed out the absence of precloacal pores in both sexes (p. 364) and that the species has 105–110 midbody scales (p. 365). Laurent (1982) indicated that the female holotype is deposited in the Museo de La Plata (Argentina), without any museum number. The specimen lacks precloacal pores

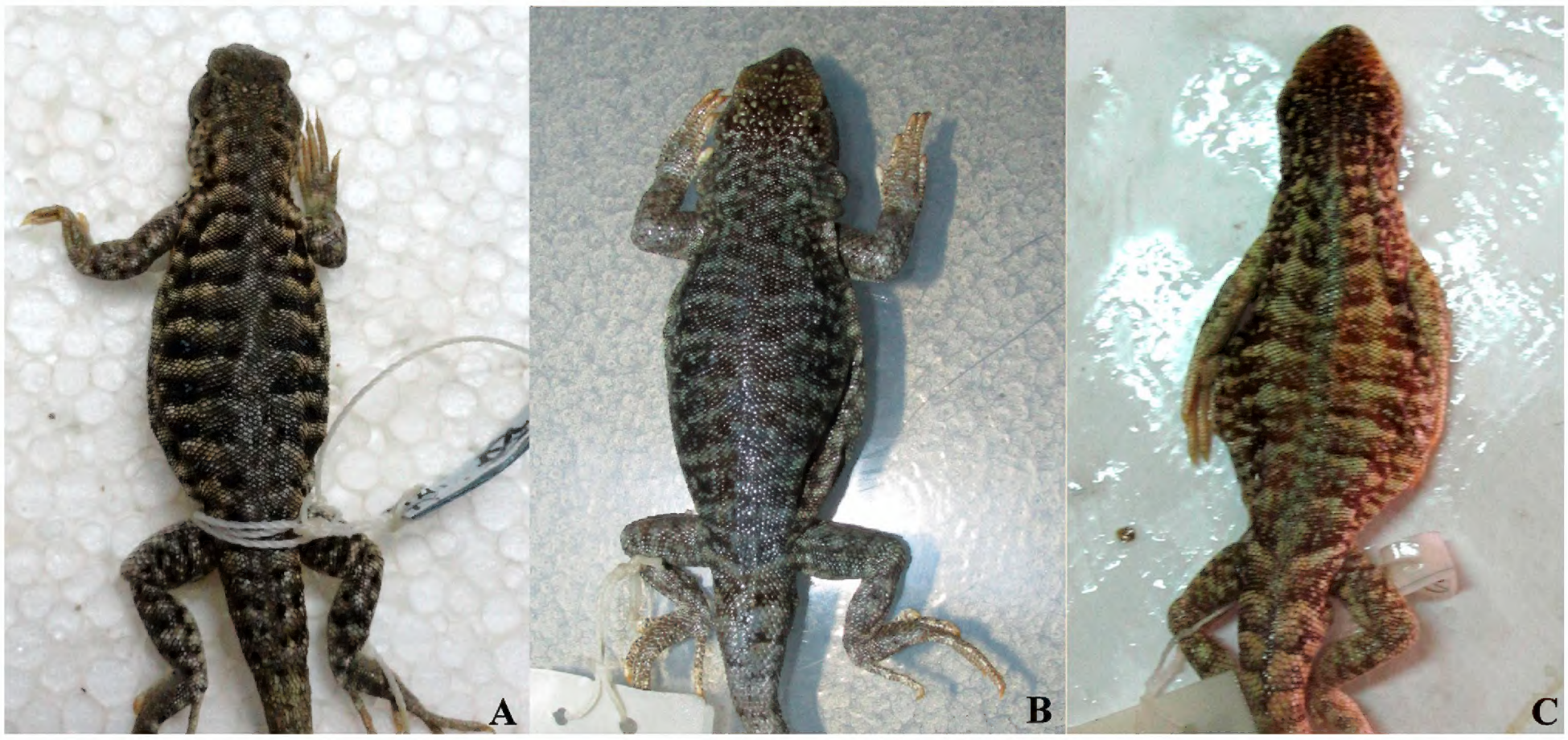

Figure 6. Comparison between specimens of *Liolaemus multicolor* and *L. molinai*. A) Male juvenile specimen of *L. multicolor* from Acay, Argentina (MCN 1009, SVL = 55.4 mm, photograph by S. Valdecantos). B) Male specimen diagnosed as *L. multicolor* by Pincheira-Donoso and Núñez (2005) and reidentified as *L. molinai* in this work (MNHN-CL 2988, SVL = 55.7 mm). C) Holotype male of *L. molinai* (MNHN-CL 3174, SVL = 70.5 mm).

Figure 7. Comparison between specimens of *Liolaemus multicolor* and *L. molinai*. A) well developed precloacal pores in the juvenile male MNHN-CL 2988 (SVL = 55.7 mm). B) Undeveloped precloacal pores in the juvenile male MCN 1009 (SVL = 55.4 mm).

and has 98 midbody scales. Additionally, Laurent examined a male of uncertain status (not a type) from Catamarca province that, according to him, could correspond to another species (p. 90). According to Ferraro and Williams (2006) the type series is lost. The species is not listed in the IUCN Red List (IUCN 2013).

Currently, the true identity of *Liolaemus andinus* and the specific location where it was collected are unknown. Schulte *et al*. (2000) mentioned specimens from La Rioja and Jujuy provinces (Argentina). Lobo *et al*. (2010) pointed out that the record from Jujuy is probably *L. multicolor* (p. 7), and since the type locality of *L. andinus* is not known, the record from La Rioja should be taken with caution. Additionally, Abdala *et al*. (2008) recorded specimens from Aguas Calientes, Las Grutas (20 Km from Paso San Francisco), near Río Chaschuil (42 Km SE from Paso San Francisco), 68 Km NW from Río San Francisco and Cazadero Grande, all in Catamarca province, Argentina. However, although *L. andinus* is a species of uncertain status, they did not provide data to support these records. Moreover, Abdala *et al*. (2008) pointed out that females of *L. andinus* have no precloacal pores (p. 461), but based on the same specimens Abdala *et al*. (2013) pointed out that females of *L. andinus* have up to four precloacal pores (x = 2) (p. 1568). Abdala *et al*. (2013) indicated that these specimens have 76–88 midbody scales, whereas Koslowsky (1895) and Laurent (1982) (they examined the currently lost type specimens of *L. andinus*) indicated 105–110 and 98 midbody scales, respectively, for *L. andinus*. Since the two major diagnostic characters of *L. andinus* do not match the information provided by Abdala *et al*. (2013), these specimens should not be considered conspecific with *L. andinus*.

The same applies to records from Chile. Halloy *et al*. (1991) indicated the presence of *Liolaemus andinus* in Cuesta Colorada (4500 m), 20 Km E of Maricunga, Atacama Region, and published a photograph of one specimen (p. 64). They indicated that *L. andinus* has 95–110 scales around midbody, however they did not list specimens collected and did not indicated if males have precloacal pores or not. Later, *L. andinus* was included in Chile by Núñez and Veloso (2001). Thereafter, Pincheira-Donoso and Núñez (2005) included *L. andinus* for Chile, extended its distribution to the Antofagasta Region and indicated that *L. molinai* and *L. schmidti* are synonyms of *L. andinus* (without any data supporting their claim). These synonyms were rejected by Lobo *et al*. (2010). I agree with this because the males of *L. schmidti* and both sexes in *L. molinai* have precloacal pores, whereas *L. andinus* lacks precloacal pores in both sexes according to Koslowsky (1895). Later, Abdala and Quinteros (2008) listed one specimen from Maricunga (FML 2553). Finally, *L. andinus* was included for the Atacama Region by Valladares (2011) and Troncoso-Palacios and Marambio (2011) based on a literature review. Additionally, Troncoso-Palacios and Marambio (2011) published a photograph of one specimen from Laguna Verde (40 Km E of Cuesta Colorada), but this male specimen has precloacal pores and assigning it to *L. andinus* was incorrect.

The photograph of *Liolaemus andinus* published by Halloy *et al*. (1991) strongly resembles a female *L. rosenmanni* Núñez & Navarro, 1992 (Figure 8), and Cuesta Colorada is only 20 Km E of Maricunga, where the allotype of *L. rosenmanni* (DBGUCH-0916) was collected, and 22 Km E of Laguna Santa Rosa where Moreno *et al*. (2000) recorded *L. rosenmanni*. Both records from Maricunga, Halloy *et al*. (1991) and Abdala and Quinteros (2008), are probably specimens of *L. rosenmanni*. On the other hand, it is necessary to collect specimens from Laguna Verde and carry out a formal study to clarify its taxonomic assignment.

Moreover, males of *Liolaemus rosenmanni* always have precloacal pores (Núñez and Navarro 1992). The two males of *L. rosenmanni* that I examined (from La Ola) also have precloacal pores. According to Núñez and Navarro (1992), *L. rosenmanni* has more than one hundred midbody scales (unspecified range or count). In a previous work I found a range of 86–92 midbody scales for *L. rosenmanni* from La Ola (Troncoso-Palacios and Ferri-Yáñez 2013) and according to Mr. D. Esquerré, the holotype of *L. rosenmanni* has 93 midbody scales (pers. comm.). Therefore, the midbody scale range is 86–93 for *L. rosenmanni* and 98–110 for *L. andinus*. These characteristics allow me to reject the hypothesis that *L. rosenmanni* coud be a synonym of *L. andinus* because males of *L. rosenmanni* have precloacal pores and both species have different midbody scale count ranges.

In conclusion, *Liolaemus andinus* should be considered endemic to Catamarca, Argentina. However, the type specimens are apparently lost, and if it is not possible to collect topotypic specimens matching the description of Koslowsky (1895) to designate a neotype, *L. andinus* should be considered a *nomen dubium*, since it is a name of unknown application (ICZN 1999). Records from Jujuy (Argentina) and Atacama (Chile) probably correspond to other species.

I hope this article will help to clarify the distribution of these species of the *montanus* group, whose study is hampered by their high altitude ranges and sometimes by the difficulty of accessing such extreme locations. Also, I hope this article will serve to call attention to the confusion that can be the result of records of poorly known species without voucher specimens or without defining the locality of the collection. At the same time, I hope this article helps to stimulate the study of some populations whose taxonomic status still remains uncertain.

Figure 8. Female of *Liolaemus rosenmanni* from La Ola, Atacama, Chile (SSUC Re 148, SVL = 68.0 mm). Note the great similarity to the photograph of "*L. andinus*" published by Halloy *et al*. (1991).

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Appendix 1. Specimens Examined.

Liolaemus molinai. MNHN-CL 3174 (holotype), 3175 (allotype), 3424-25 (paratypes). Los Farellones de Tara, Provincia de Loa, Región del Antofagasta. A. Hinojosa, A, Moreira & J.P. Valladares cols. 17/01/1999. MNHN-CL 4368, 4373. Laguna Lejía. H. Núñez, J, Yáñez & P. Contreras cols. 13-26/02/2008.

Liolaemus multicolor (reidentified as a juvenile of *L. molinai*). MNHN-CL 2988. Salar de Aguas Calientes (4200m). H. Núñez & J. Yáñez cols. 23/02/1998.

Liolaemus pleopholis. MNHN-CL 3950-51. Caquena, Región de Arica y Parinacota. H. Núñez, C. Garín & D. Pincheira-Donoso cols. 11/12/2003.

Liolaemus rosenmanni. SSUC Re 142-51, 394. La Ola, Salar de Pedernales, Región de Atacama. F. Ferri col. 20/11/2011.

Liolaemus signifer. MNHN-CL 2065-66. Tacora, Visviri, Región de Arica y Parinacota. S. Silva col. Marzo 1990.